** This is a Region 5 Targeted Brownfields Assessment Funded Project **

PHASE II
SAMPLING AND ANALYSIS PLAN ADDENDUM
FOR THE
SK HAND TOOLS SITE
DEFIANCE, DEFIANCE COUNTY, OHIO

Prepared for:
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 5
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Chicago, Illinois 60604

and

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ACRONYM LIST

ACBM	Asbestos-containing building materials
AHERA	Asbestos Hazard Emergency Response Act
AST	Aboveground storage tank
ASTM	American Society for Testing and Materials
bgs	Below ground surface
CFR	Code of Federal Regulations
CNS	Covenant Not-to-Sue
COC	Contaminant of concern
CP	Certified Professional
CRO	Cessation of Regulated Operations
DCEDO	Defiance County Economic Development Office
DRO	Diesel range organics
DUP	Duplicate
ft	Foot or feet
GPR	Ground-penetrating radar
GPS	Global Positioning System
GRO	Gasoline range organics
HASP	Health and Safety Plan
IA	Identified area
ID	Identification
IDW	Investigation-derived waste
IPIR	Initial Pollution Incident Report
Keramida	Keramida Associates
MS/MSD	Matrix spike/matric spike duplicate
mL	Milliliter
MW	Monitoring well
NA	Not applicable
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NFA	No Further Action
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
OTIE	Oneida Total Integrated Enterprises
OUPS	Ohio Utilities Protection Service
PCB	Polychlorinated biphenyls
Phase I PA	Phase I Property Assessment
Phase II PA	Phase II Property Assessment
PID	Photoionization detector
POC	Point of compliance
Property	SK Hand Tools Site
PRP	Primary responsible party
QA/QC	Quality assurance/quality control
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
SA	Site Assessment

SAP	Sampling and Analysis Plan
SB	Soil boring
SOP	Standard operating procedure
SQG	Small-quantity generator
START	Superfund Technical Assessment and Response Team
SVOC	Semivolatile organic compounds
TB	Trip blank
TBA	Targeted Brownfields Assessment
TCLP	Toxicity characteristic leachate procedure
Test America	Test America, Inc.
Tetra Tech	Tetra Tech, Inc
TPH	Total petroleum hydrocarbons
U.S. EPA	United States Environmental Protection Agency
USCS	Unified Soil Classification System
UST	Underground storage tank
VAP	Voluntary Action Program
VOC	Volatile organic compound

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) Addendum identifies the Phase II Property Assessment (Phase II PA) data collection, reporting activities, and associated quality assurance/quality control (QA/QC) measures specific to the SK Hand Tools site (Property), located in Defiance, Defiance County, Ohio (**Figure 1**).

The Property consists of six parcels of land totaling approximately 8.245 acres (according to the Defiance County auditor's website) and is divided into eastern and western portions by Hickory Street. Five parcels, and one building constructed in 1910 with approximately 143,491 square feet that housed the main manufacturing operations, are located east of Hickory Street. One parcel is present to the west of Hickory Street and contains a former vehicle garage and gravel parking lot.

The Tetra Tech Inc. (Tetra Tech) Superfund Technical Assessment and Response Team (START) has prepared this SAP Addendum describing additional Phase II PA activities to be completed under a Targeted Brownfields Assessment (TBA) Grant. This work is being completed for the United States Environmental Protection Agency (U.S. EPA) in response to a request from the Defiance County Economic Development Office (DCEDO) to perform environmental assessment activities to determine the presence of contamination and prepare a Phase II PA report. Tetra Tech completed the original SAP in March 2016 for the initial Phase II PA activities at the Property; this SAP Addendum is for additional Phase II PA activities (soil sampling delineation) at the Property.

Data will be generated in accordance with the quality assurance requirements described in the *Quality Assurance Project Plan (QAPP) For Region 5 Targeted Brownfields Assessment Projects in Indiana, Illinois, Michigan, Minnesota, Ohio and Wisconsin (For Hazardous Substances and Petroleum)(TBA QAPP)*, dated June 30, 2014, revised in July 2015. This SAP Addendum will reference the *TBA QAPP* for generic tasks common to all data collection activities including routine procedures for sampling and analysis, sample documentation, equipment decontamination, sample handling, and data management, assessment and review. Additional Property-specific procedures and/or modifications to procedures described in the *TBA QAPP* are described in the Property-specific QAPP Addendum and in the following SAP Addendum elements.

The Phase II PA will be conducted in accordance with the Ohio Environmental Protection Agency (Ohio EPA) Voluntary Action Program (VAP) as codified by Ohio Administrative Code (OAC) 3745-300-07. The purpose of a Phase II PA is to conduct an investigation sufficient to determine whether all applicable standards are met or to determine that remedial activities conducted in accordance with rule 3745-300-11 of the OAC meet or will achieve applicable standards.

This SAP Addendum was prepared, reviewed, and approved in accordance with the procedures detailed in the *TBA QAPP*. Any deviations or modifications to the approved SAP Addendum will be documented using **Table 1**: SAP Addendum Revision Form.

2.0 PROJECT TEAM

Management of the Property will be as documented in the *TBA QAPP* and Property-specific *QAPP Addendum*. These documents present an organizational chart, communication pathways, personnel responsibilities and qualifications, and special personnel training requirements.

The following personnel will be involved in planning and/or technical activities performed for this data collection activity. Each will receive a copy of the approved SAP Addendum. (A copy of the SAP Addendum will also be retained in the Property file).

Personnel	Title	Organization	Phone Number	Email
Brad Stimple	TBA Program Manager and Project Manager	U.S. EPA	(440) 250-1717	stimple.brad@epa.gov
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Tim Schnieber	Project Geologist	START	(513) 333-3680	tim.schnieber@tetratech.com
Deborah Dunn	Laboratory Client Relations Manager	Test America	(330) 966-9292	deborah.dunn@testamericainc.com

3.0 PROBLEM DEFINITION, SITE BACKGROUND, AND PROJECT PLANNING

3.1 PROBLEM DEFINITION

In 2014, Keramida Associates (Keramida) completed a Phase I Property Assessment (Phase I PA) of the Property to determine the site's eligibility for participation in the Ohio VAP and determine identified areas (IA) requiring additional investigation in a Phase II PA. The Phase I PA was completed in November 2014 and is included as **Attachment A**.

This current effort is being conducted based on the recommendations from the 2014 Keramida Phase I PA and historical information obtained by Tetra Tech during development of the March 2016 SAP, as well as the findings from Tetra Tech's initial Phase II PA activities in spring 2016. The ultimate goal is to evaluate the IAs relative to applicable standards in pursuit of a "No Further Action" (NFA) letter from a VAP-certified professional and a "Covenant Not-to-Sue" (CNS) from the Ohio EPA for the Property. Details of Keramida's November 2014 PA are further discussed in **Section 3.2.3**, and details of Tetra Tech's initial Phase II PA field activities are further discussed in **Section 3.2.5.**

3.2 SITE BACKGROUND

In October 2015, Defiance County Economic Development Office submitted a request to U.S. EPA, requesting federal TBA assistance to perform Phase II PA activities in accordance with Ohio EPA's VAP. The anticipated future use is commercial/industrial.

The Property is known as SK Hand Tools and is located in Defiance, Defiance County, Ohio. According to the Keramida Phase I PA, the Property consists of six parcels of non-contiguous land totaling approximately 8.245 acres in size. The facility was used for manufacturing for at least 65 years, prior to 2010. The most recent operating entity, SK Hand Tools, functioned as a manufacturing plant for the production of hand tools. The tools were manufactured from raw bar stock to finished goods. According to the Keramida Phase I PA, processes conducted by SK Tools included forging, die sinking, blanking, machining, broaching, polishing, heat treating, plating, and coating of steel.

The Keramida Phase I PA also noted supporting features such as underground storage tanks (USTs), aboveground storage tanks (ASTs), transformers, hydraulic lifts, and various trenches and drains also existed at the facility. The facility received an NFA dated July 13, 1991, for a 15,000-gallon kerosene UST and a 5,000-gallon diesel UST; both USTs were removed on January 1, 1992.

SK Hand Tools conducted metal plating and polishing operations at the Property until the operations ceased in July 2010. The Ohio EPA indicated that SK Hand Tools was served a "Cessation of Regulated Operations (CRO)" which expired on April 15, 2011. SK Hand Tools failed to comply with the CRO and several drums and various containers of waste remained at the Property.

Previous site investigations included a May 1993 Initial Pollution Incident Report (IPIR) completed by Ohio EPA, a 2011/2012 Site Assessment (SA) performed by Oneida Total

Integrated Enterprises (OTIE), a Phase I PA completed by Keramida in 2014, a Tetra Tech asbestos survey in 2015, and an initial Tetra Tech Phase II field investigation in spring 2016. These investigations are described in detail below.

3.2.1 IPIR, May 1993

In May of 1993, Ohio EPA submitted an IPIR for "sloppy operations" against SK Tools. According to the IPIR, metal fibers and particles released from stacks covered the land and also covered cars parked near the plant. The IPIR indicated that fibers had been "taking paint off of cars" and this had been an ongoing problem.

3.2.2 Site Assessment (SA) – OTIE, 2011/2012

Due to the presence of debris, and unsecured drummed wastes at the Property, Ohio EPA requested assistance from U.S. EPA Region 5, which contracted with OTIE as the START contractor. According to the Keramida Phase I PA, OTIE performed the SA; prepared a site-specific Health and Safety Plan (HASP) and a field Sampling and Analysis Plan; collected drum and solid samples; documented on-site conditions with logbook notes and still photographs; evaluated analytical data; and prepared the SA Report.

Before sampling, OTIE performed field screening on drum contents, using cyanide monitors, to check for volatile organic compounds (VOCs). During sampling, liquid, sludge, and solid samples were collected and submitted for cyanide, toxicity characteristic leachate procedure (TCLP) metals, VOCs, and semivolatile organic compounds (SVOCs) analyses, and pH determination. At least one sampled drum contained cyanide and met the cyanide characteristics of reactivity per 40 Code of Federal Regulations (CFR) 261.23 regulations. This container was highly deteriorated. Two of the drums sampled contained highly acidic compounds that satisfied the hazardous characterization for corrosivity per 40 CFR Section 261.22. Several drums were labeled with U.S. EPA hazardous waste numbers per 40 CFR Section 261.24 and Section 261.31. The presence of these hazardous wastes may have posed a threat to nearby residents through direct exposure because the Property had evidence of vandalism.

According to the Keramida Phase I PA, U.S. EPA START completed a removal at the site in 2012. The removal included hazcatting, combining, overpacking, and disposing of significant quantities of various drummed wastes off site, including wastewater sludge from plating operations, corrosive and various other liquids, and empty containers. The final U.S. EPA START Pollution Report indicated that the removal was completed at the end of June 2012 and that no potentially responsible parties (PRPs) were found. The final report also indicates that various areas, such as the heat treat/oil room and plating room were "cleaned" and documented the following wastes (post hazcatting and combining) that were generated by START and removed from the site:

Waste Stream	*Medium*	*Quantity*	*Manifest #*	*Treatment*	*Disposal*
Sodium Hydroxide	Solid	55 gal	009654980 JJK	X	
Sodium Bisulphite	liquid	55 gal	009654981 JJK	X	
Base liquids cossosive	liquid	70 gal	009654982 JJK	X	
Sulphuric Acid	liquid	165 gal	009654980 JJK	X	
Hydrochloric Acid	liquid	180 gal	009654980 JJK	X	
Neutral Liquids (D007)	liquid	2106 gal	009654979 JJK	X	
Grease	semi-solids	2 cu yds	009654981 JJK		x
Latex Paint cans,off spec	liquid	1 cu yd	009654981 JJK		x
oil base paint, off-spec	liquid	1 cu yd	009654979 JJK		x
oil-water mix	liquid	2004 gal	010011811 JJK	X	
Tolylidene diisocyanate	liquid	40 lbs	010008982 JJK	X	
RCRA empty containers ,non-haz	Solids	120 cu yd			x

Source: Keramida 2014

3.2.3 Keramida Phase I PA, 2014

In 2014, Keramida was subsequently tasked by Defiance County with completing a Phase I PA of the site to determine the site's eligibility for participation in the Ohio VAP and determine whether specific IAs would require additional investigation in a Phase II PA. The Phase I PA was completed in November 2014 and included as **Attachment A**.

The Phase I PA concluded the IAs listed below were associated with the Property and identified on **Figure 2**:

Identified Area	Location	Justification
1	Auto Garage	Potential impact due to possible storage and use of solvents and petroleum substances.
2	Drum Storage Area	Potential release of petroleum and/or hazardous substances.
3	Plating Area	Potential impact due historic use of the area for plating operations.
4	Wastewater Trench	Potential impact due to historic use of trench transporting wastewater.
5	Wastewater Treatment Area	Potential impact due to the past wastewater treatment operations. Floor staining was observed near the treatment equipment.
6	Hydraulic Pit	Potential release of hazardous substances from hydraulic equipment.

Identified Area	Location	Justification
7	Wet Storage Area	Potential release due to the storage of unknown materials.
8	Polychlorinated biphenyl (PCB) containing Transformer	Potential PCB impact from transformer.
9	Heat Treatment Area	Potential release due to historic use of the area for heat treatment operations. This area includes the former ASTs containing quench oil.
10	Former Used Oil AST Storage Area	Potential release due to the storage of hazardous materials.
11	Former Diesel Fuel AST Storage Area	Potential release due to the storage of hazardous materials.
12	Groundwater Underlying Entire Property	Potential impact from on-site activities as well as nearby facilities including a Resource Conservation and Recovery Act (RCRA)-Small Quantity Generator (SQG) facility.

Source: Keramida 2014

3.2.4 Tetra Tech Asbestos Survey, 2015

At the direction of Ohio EPA, Tetra Tech performed an asbestos-containing building materials (ACBM) assessment of the building located at 135 Hickory Street, Defiance, Ohio. Tetra Tech performed a site reconnaissance and sampling effort to evaluate potential for ACBMs within the building on September 14 and 15, 2015. Site access was provided by Mr. Jerry Hayes with the City of Defiance. Since renovation/demolition activities were anticipated, the ACBM evaluation was conducted in accordance with the Asbestos Hazard Emergency Response Act (AHERA) and National Emissions Standards for Hazardous Air Pollutants (NESHAP). Tetra Tech's assessment revealed the following:

- Analytical results indicated that asbestos was present in the following areas: debris/roofing pile located in the anneal room, window glazing throughout the buildings, floor tile in the offices, ceiling plaster in an office, transite piping in the warehouse, and insulation in the electrical discharge machining room.

- While the majority of the pipe insulation observed appeared to be newer fiberglass insulation, laboratory results indicated that some asbestos-containing insulation remained. Tetra Tech was not able to fully quantify the insulation due to in-place drop ceilings.

Intrusive sampling activities will not take place in areas of documented ACBMs to limit potential exposure to asbestos during this Phase II PA.

3.2.5 Tetra Tech Initial Phase II PA Field Activities, 2016

Tetra Tech completed the initial Phase II PA activities at the Property in spring 2016 at the request and authorization of the U.S. EPA for the Defiance County Economic Development Office through the Region 5 START TBA program. Phase II PA activities included soil boring and monitoring installation as well as soil and groundwater sampling. Soil samples were

collected from 40 sampling locations, and one permanent groundwater monitoring well was installed and subsequently sampled at the Property. Sampling locations from Tetra Tech's initial Phase II field sampling event (spring 2016) are presented on **Figure 3**.

Findings from the initial Phase II PA indicated two soil samples containing metals exceeding VAP generic direct contact soil standards (GDCSS). The 0-2 foot (ft) below ground surface (bgs) samples of soil boring (SB) SB-23 and SB-32 contained lead exceeding construction/ excavation standards and the 0-2 ft bgs sample of SB-23 also contained chromium exceeding commercial/industrial standards. Only an unspeciated chromium (total chromium) sample was collected from the 0-2 ft bgs sample of SB-23; therefore, the sample was conservatively compared to the VAP GDCSS for hexavalent chromium. Additionally, a total of five soil samples (the 0-2 ft bgs intervals from SB-12, SB-14, SB-32, and MW-04, as well as the 2-4 ft bgs interval from MW-04) contained total petroleum hydrocarbon (TPH) gasoline range organics (GRO), TPH diesel range organics (DRO), and/or TPH oil range organics (ORO) at concentrations exceeding Bureau of Underground Storage Tank Regulations (BUSTR) Soil Saturation Limits.

Groundwater saturation was encountered at only two boring locations at the Property, indicating that areas of saturation within the upper 38 feet of the subsurface are discontinuous and limited in lateral extent. One permanent monitoring well (MW-01) was installed and one groundwater sample was collected from this well. Detected compounds within the Property groundwater meet VAP unrestricted potable use standards (UPUS). In addition to MW-01, saturated soil conditions were observed at MW-04 from 3 ft to 6 ft bgs, which likely originated from surface infiltration from pooling water within the warehouse. A temporary 1-inch diameter piezometer was installed at this location to allow for collection of a grab water sample. The grab sample data was utilized for screening purposes to determine if further evaluation was warranted within the area. With the exception of metals, results of the grab water sample indicated trace to low concentrations of contaminants of concern (COCs). Due to the turbid condition of the sample upon collection, the metals analytical results were determined not usable for screening purposes.

3.3 PROJECT PLANNING

As part of the initial Phase II PA field activities, Tetra Tech prepared a HASP for the Property, which was forwarded to U.S. EPA after approval by Tetra Tech's Health and Safety Coordinator. Tetra Tech will modify the HASP, as needed, to address the proposed scope of work as discussed within this SAP Addendum. Tetra Tech has administered the drilling subcontract to EnviroCore, LLC. (EnviroCore) of Plain City, Ohio, who completed the initial Phase II PA drilling work in spring 2016. The analytical samples for this Phase II PA will be submitted to Test America, Inc., (Test America) of Canton, Ohio. During the initial Phase II PA, Test America completed the laboratory analyses under the Ohio EPA state term laboratory contract, though, for this round of sampling, Test America will be subcontracted through Tetra Tech. Test America is an Ohio VAP-certified laboratory, No. 0024.

Prior to performing intrusive activities on the Property, Tetra Tech will contact the Ohio Utilities Protection Service (OUPS) to mark out underground utilities. In addition, since the investigation will be completed on private property, Tetra Tech will use a private utility locating contractor (GeoSearches) to clear boring locations using various techniques including ground-penetrating

radar (GPR) before drilling commences. Locations not be suitable for drilling (due to utilities or other obstructions) will be moved as close as possible to the original location and will be approved by U.S. EPA before drilling proceeds.

During the investigation efforts, Tetra Tech will conduct field screening with a MultiRAE photoionization detector (PID) to guide the sampling effort, maximizing the effectiveness of the field mobilization. This approach will allow for adjustments to field sampling activities as the project progresses.

3.3.1 Identified Area Designation

The Phase II PA will be conducted in accordance with the Ohio EPA VAP as codified by OAC 3745-300-07. As per OAC 3745-300-06 (E)(1), the volunteer must identify each area at the Property where a release of hazardous substances or petroleum has or may have occurred to environmental media. Based on a review of the Property history, and the 2014 Phase I PA data used for the March 2016 SAP, Tetra Tech developed the following four IAs in addition to the 12 listed in the Keramida Phase I PA. Tetra Tech eliminated the Groundwater Underlying Entire Property IA from the Keramida Phase I PA, based on the sampling approach to the Phase II PA. The newly developed IAs and rationale for selection are listed below and are also displayed on **Figure 2.**

Location	Identified Area	Justification
12	Auto Garage Lot	Evaluate potential soil and groundwater due to onsite activities as well as nearby facilities including a RCRA-SQG facility.
13	Mill Area	Evaluate potential soil and groundwater impacts due to historic use as a milling area.
14	Snag Area	Evaluate potential soil and groundwater impacts due to historic use as a snag area.
15	Forge Area	Evaluate potential soil and groundwater impacts due to historic use as a forge.

4.0 PROJECT DESCRIPTION AND SCHEDULE

4.1 PROJECT DESCRIPTION

The purpose of the Phase II field sampling program is to identify potential contamination source areas, delineate the extent of contamination encountered at the Property, and to determine whether additional source areas are contributing to contamination at the Property. The scope includes:

- Additional soil sampling in order to delineate and further evaluate soil conditions at the Property;
- Further characterizing the geology and subsurface conditions at the Property;
- Identifying and evaluating potential COC migration and exposure pathways.

The tasks described below will be completed during the additional Phase II PA field activities.

Soil Boring Installation: Drilling activities associated with this investigation include the installation of 21 soil borings (SB) to 10 ft below ground surface based upon a 10-ft point of compliance (POC) for the construction/excavation worker direct contact scenario. The proposed locations are shown on **Figure 4**. The sample design plan, including sample numbers and locations, is described in **Section 6**.

Soil samples will be collected continuously from the ground surface to the termination depth; samples will be screened in the field for the potential presence of COCs using a PID. Two samples from each boring will be submitted to the laboratory for analysis; one from 0-2 ft bgs interval and the other from the interval most likely impacted based upon field observations (PID, visual, and/or olfactory), which will be from 2-10 ft bgs.

Groundwater Monitoring Well Installation: New monitoring wells will not be installed during this proposed scope of work.

Soil Sample Analysis: Soil samples will be analyzed for TPHs (GRO, DRO, and ORO), lead, total chromium, and/or hexavalent chromium (**Table 2**).

Groundwater Sample Analysis: Groundwater samples will not be collected during this proposed scope of work.

Reporting: At the conclusion of the field activities presented within this SAP Addendum, Tetra Tech will prepare an Ohio VAP-compliant TBA Phase II PA Report for submission, which will include the findings and results from the initial Tetra Tech Phase II PA sampling conducted in the spring of 2016. Tetra Tech's report will include information as outlined in OAC 3745-300-07(J). The proposed sampling approach for the additional field investigation is presented in **Section 6**.

4.2 PROJECT SCHEDULE

The primary project tasks are anticipated to be completed in accordance with the schedule summarized below.

4.2.1 Planning and Mobilization

The planning phase of the additional Phase II PA field work began with the preparation of this Phase II SAP Addendum. Following U.S. EPA approval of this Addendum, tasks associated with project planning and mobilization are anticipated to require up to 2 weeks. These tasks include finalization of the HASP, subcontractor procurement, utility clearances, and mobilization to the Property. Mobilization to the Property for the primary field investigation is estimated to occur within 3 weeks following SAP Addendum approval, and approximately one week will be required to complete the field work phase.

4.2.2 Surveying

Tetra Tech will use a Trimble Pro XR (or equivalent) global positioning system (GPS) to provide documentation of soil boring locations. The surveying is anticipated to be completed in less than 1 day and will take place upon completion of soil boring installation activities.

4.2.3 Laboratory Analyses and Data Validation

Standard laboratory analytical turnaround times (2 weeks) will be assumed throughout the project. Appropriate data validation tasks can be completed within two weeks of final data receipt.

4.2.4 Initial Preparation and Distribution of Investigative Tables and Figures

Data reduction, tabulation, map preparation, and interpretation tasks can be completed within 2 weeks of the completion data validation task.

4.2.5 Reporting

Tetra Tech will complete the Draft TBA Phase II PA Report approximately 3 weeks after validation of data is complete, including internal report review. Assuming a 2-week review time, preparation of the second draft will require two weeks, followed by another 2-week review, and one week for report finalization and distribution. The final TBA Phase II PA Report is therefore anticipated to be completed approximately 10 weeks after the initial preparation and distribution of the investigative tables and figures. The Phase II PA Report will include findings from Tetra Tech's initial Phase II sampling event (spring 2016), as well as the scope of work described within this SAP Addendum.

5.0 PROJECT QUALITY OBJECTIVES

5.1 PROJECT OBJECTIVES

This project is being completed to determine the presence of COCs and facilitate redevelopment of the Property.

5.2 MEASUREMENT AND PERFORMANCE CRITERIA

Site-specific measurement and performance criteria described in the Site-specific *QAPP Addendum* will be used to ensure that data are sufficiently sensitive, precise, accurate, and representative to support Property decisions.

5.3 DATA QUALITY OBJECTIVES

Data quality objectives address requirements that include when, where, and how to collect samples, the number of samples, and the limits on tolerable error rates. These steps should periodically be revised as new information becomes available. **Sections 5.0** and **6.0** address these objectives.

The purpose of the Phase II PA is to conduct an investigation to determine whether all applicable standards are met, and to ensure that remedial activities, conducted in accordance with Rule 3745-300-11 of the OAC at the Property, meet or will achieve applicable standards.

Soil sample results will be compared to Ohio VAP generic direct-contact soil standards for the commercial/industrial and construction/excavation scenarios found in Rule 3745-300-08 of the OAC.

6.0 SAMPLING DESIGN

The sample design for this SAP Addendum is based on Keramida's November 2014 Phase I PA report, which designated 12 IAs (as discussed in **Section 3.2.3**); Tetra Tech's addition of four IAs (as discussed in **Section 3.3.1**); Tetra Tech's discussions with the U.S. EPA and other stakeholders; and the findings from Tetra Tech's initial Phase II PA activities performed in spring 2016 (**Section 3.2.5**). Tetra Tech identified 21 soil boring locations at the Property (**Figure 4**). Sample locations may be moved during the investigation based on Property conditions, utility locations, and field observations. Tetra Tech will utilize Standard Operating Procedures (SOPs) to complete the field investigation which are provided in the approved Brownfields QAPP (Tetra Tech 2014).

The soil boring locations were chosen and will be placed in areas where soil concentrations detected within the initial Tetra Tech Phase II PA require additional delineation. The soil boring locations will allow for additional characterization of the IAs in order to satisfy requirements within OAC 3745-300-07(F)(6). **Figure 4** indicates the proposed sampling locations, and **Table 3** includes laboratory analytes, sample numbers, and QA/QC samples required. The complete sample design is discussed in **Section 4.1** and is summarized below:

- 21 soil borings will be advanced to 10 ft bgs. Tetra Tech will collect two soil samples from each soil boring to be submitted for laboratory analysis. One sample will be collected from the 0-2 ft bgs interval and the other from the interval most likely impacted based upon field observations (PID, visual, and/or olfactory) between 2 and 10 ft bgs. Soil samples from 13 of the soil borings will be submitted for analysis of TPHs (GRO, DRO, and ORO); soil samples from 4 of the soil borings will be submitted for analysis of TPHs (GRO, DRO, and ORO) and lead; and soil samples from the remaining 4 soil borings will be submitted for analysis of hexavalent chromium, total chromium, and lead.

- The newly installed soil borings will be GPS surveyed to document location.

6.1 SAMPLE COLLECTION

6.1.1 Soil Sampling

Drilling equipment will be decontaminated by the drilling subcontractor at a designated location on the Property before drilling operations begin, between soil boring locations, and at the completion of the project in accordance with Tetra Tech's SOP No. 002 on General Equipment Decontamination. Decontamination will be conducted on a temporary decontamination pad constructed at satellite locations within the Property area in support of temporary work areas. The purpose of the decontamination pad is to contain wash waters and potentially contaminated soil generated during decontamination procedures. Wash waters and contaminated soil generated during decontamination activities will be considered contaminated and thus should be collected and containerized as IDW for proper disposal.

The general procedures for soil sampling activities will follow Tetra Tech's SOP No. 005: Soil Sampling Procedures, and are summarized below:

- Prior to the start of the drilling activities, Tetra Tech will contact OUPS to mark any on-site utilities. In addition, a private utility locating firm (GeoSearches) will be utilized to clear each boring on the Property;

- Prior to drilling activities, drilling equipment will be decontaminated in accordance with SOP No. 002;

- A qualified Tetra Tech geologist will describe each soil boring in accordance with American Society for Testing and Materials (ASTM) method D2488. The lithology for each boring will be classified using the Unified Soil Classification System (USCS);

- Tetra Tech will collect two soil samples from each of the 21 soil borings advanced to 10 ft bgs;

- Soil will be continuously collected using direct push dual-tube sampling technology. The sampling liner will be opened and a sample for VOC analysis will be collected using a Terracore sampler. The interval will also then be field screened for VOCs by placing an aliquot from every 2-ft interval into a Ziploc bag. The samples will then be screened with a PID, and soil samples will be collected for analysis of the remaining parameters;

- Duplicates will be collected for every 20 samples collected. A duplicate sample will be collected from the same sample interval as the original. Additional QA/QC information is provided in **Section 11**;

- Analytical parameters, sample containers, volumes, and preservatives will be as shown in **Table 3**;

- Sample containers will be placed in a cooler with ice immediately after collection. Coolers will contain enough ice to maintain sample temperature at 4 degrees Celsius. Coolers will then be sent by courier or shipped overnight to the analytical laboratory;

- Sample numbering procedures are presented in **Section 6.3**; and

- Due to the shallow depths of the proposed soil borings, as well as the volume needed for laboratory sample analysis, excess soil cuttings are not anticipated.

6.2 SURVEYING

Tetra Tech will use a Trimble Pro XR (or equivalent) GPS to provide documentation of soil boring locations. The GPS system, capable of sub-meter accuracy, will be acceptable for northing and easting coordinate determination.

6.3 SAMPLE NUMBERING SYSTEM

Samples will be identified by a unique sample identification (ID) number. The identifier will follow the same sampling ID protocol identified in the March 2016 SAP and will be composed of the following information:

- Matrix;
- Sample location;
- Sample depth (soil only); and
- Sample type (field, field duplicate, or QA/QC).

Matrix		Location Number	Depth (ft bgs)	Example Identification
Soil (Soil Boring)	Soil boring (SB)	01	08-10	SB-01-08-10
Duplicate	Duplicate (DUP)	01	08-10	SB-01-08-10-DUP
Trip Blank(TB)	Trip Blank	01	NA	TB-01

Sample locations will have unique sample IDs labeled in numerical order.

6.4 MANAGEMENT OF INVESTIGATION-DERIVED WASTES

Due to the shallow depths of the proposed soil borings, as well as the volume needed for laboratory sample analysis, excess soil cuttings are not anticipated. In the event drilling activities produce additional soil cuttings, a 55-gallon drum will be utilized to contain the soil cuttings pending laboratory results. Tetra Tech's drilling contractor will provide drums to contain soil cuttings (if necessary), and would transport the drums to an on-site location designated by U.S. EPA. The location will be accessible for future pickup by a waste disposal contractor. Following receipt of laboratory analysis, Tetra Tech will coordinate the disposal of the IDW drums.

7.0 SAMPLING PROCEDURES

7.1 STANDARD OPERATING PROCEDURES FOR SAMPLING

Sample collection will be performed in accordance with Tetra Tech's SOPs provided in Appendix D of the *TBA QAPP* and as described in **Section 6**. Sample containers will be provided by the laboratory and shall be new and pre-preserved, where necessary. Samples will be placed on ice immediately after collection and kept in a secure location. **Table 3** indicates sample containers, volumes, and preservation requirements for each analyte.

7.2 DECONTAMINATION PROCEDURES

Decontamination procedures are described in the *Generic QAPP* and in Tetra Tech's SOP No. 002. The following decontamination procedures shall be followed:

- Dedicated, single use/disposable equipment will be used wherever possible;
- Used disposable sampling supplies and disposable clothing (including gloves) will be containerized for disposal;
- Drilling equipment will be decontaminated before drilling operations begin, between borings, and at the completion of the drilling activities with a thorough Liquinox wash and rinse or steam cleaning if necessary; and
- Non-dedicated sampling equipment will be decontaminated prior to sampling with a stiff, long bristle brush, using a Liquinox or Alconox solution followed by a distilled water rinse.

8.0 SAMPLE HANDLING, TRACKING, AND CUSTODY PROCEDURES

Proper sample handling and custody procedures are crucial to ensuring the quality and validity of data obtained through field and laboratory analyses. Samples will be handled, tracked, and shipped in accordance with Tetra Tech SOP No. 076-1: Sample Custody, Packaging, and Shipment.

9.0 FIELD ANALYTICAL METHODS AND PROCEDURES

Field methods provide rapid "real-time" results for field personnel to help guide field decision-making processes. A Multi Rae PID or similar PID will be used to perform field screening of soil samples in accordance with Tetra Tech SOP No. 005. Further information is provided in the *TBA QAPP*.

10.0 FIXED LABORATORY ANALYTICAL METHODS AND PROCEDURES

Ohio VAP requires laboratories to produce certified data to support a voluntary action. The laboratory must be certified for each analyte, parameter group, and method, as defined in paragraph (A) of Rule 3745-300-01 of the OAC. The laboratory's analyses must remain consistent with the laboratory's SOPs and quality assurance program plan, as approved by U.S. EPA. The selected laboratory, Test America, is certified under Ohio VAP, certified laboratory No. 0024.

11.0 QUALITY CONTROL ACTIVITIES

11.1 FIELD QUALITY CONTROL

Field duplicate samples will be collected and analyzed for this project at a frequency of one duplicate per 20 samples. Because the samples will be collected with disposable equipment, equipment blank samples will not be collected for this project.

One trip blank comprised of pre-prepared laboratory-grade water will be enclosed in each sample shipment container in which aqueous VOC samples are included. One trip blank, comprised of a pre-preserved 40-milliliter (mL) glass vial and identified as a soil trip blank, will be enclosed in each sample shipment container in which soil VOC samples are included.

11.2 ANALYTICAL QUALITY CONTROL

An additional set of soil samples will be to be submitted for laboratory matrix spike/matrix spike duplicate (MS/MSD) analysis. MS/MSD samples will be collected for every 20 samples submitted for analysis.

12.0 DOCUMENTATION, RECORDS, AND DATA MANAGEMENT

Reports will be prepared by the Tetra Tech project manager and submitted to the U.S. EPA TBA Coordinator during the course of the project, and as described in the *TBA QAPP*.

Documentation, records, and data management will be conducted in accordance with the *TBA QAPP*.

13.0 QUALITY ASSURANCE ASSESSMENT AND CORRECTIVE ACTIONS

One field audit may be completed near the beginning of the sample collection activities; however, due to the short duration of the project, one is not planned. Field audits will include the following checklist, per the *TBA QAPP*:

Item	Description of Field Audit Activities	QA Manager Initials
1.	Review of field-sampling records	
2.	Review of field-measurement procedures	
3.	Examination of the application of sample identifications following the specified protocol	
4.	Review of field instrument calibration records and procedures	
5.	Recalibration of field instruments to verify calibration to the manufacturer's specifications	
6.	Review of the sample handling and packaging procedures	
7.	Review of COC procedures	

If deficiencies are observed, they will be noted in writing, and corrective actions may need to be implemented by the Tetra Tech project manager.

14.0 REPORTS TO MANAGEMENT

Reports will be prepared by the Tetra Tech project manager and submitted to the U.S. EPA TBA Coordinator during the course of the project, and as described in the *Generic QAPP*.

15.0 STEPS 1, 2 AND 3: DATA REVIEW REQUIREMENTS AND PROCEDURES

The following steps are necessary for proper data review:

Step 1. Data verification will be performed internally by the laboratory generating the data. Data verification may result in accepted, qualified, or rejected data.

Step 2. Data validation is an analyte-specific and sample-specific process that extends the qualification of data beyond method, procedural, or contractual compliance to determine the analytical quality of specific data sets. Data will be validated based on the project-specific QAPP.

Step 3. Data usability assessment is the process of evaluating validated data to determine if the data can be used for the purpose of the project.

16.0 REFERENCES

American Society for Testing and Materials (ASTM) D2488, Standard Practice for Description and Identification of Soils, 2009.

Keramida Environmental, Inc. (Keramida). May 2014. Phase I Property Assessment, Former SK Hand Tools.

Ohio Administrative Code 3745-300-01, Definitions for the Voluntary Action Program, 2014.

Ohio Administrative Code 3745-300-06, Phase I Property Assessments for the Voluntary Action Program, 2014.

Ohio Administrative Code 3745-300-07, Phase II Property Assessments for the Voluntary Action Program, 2014.

Ohio Administrative Code 3745-300-11, Remediation for the Voluntary Action Program, 2014.

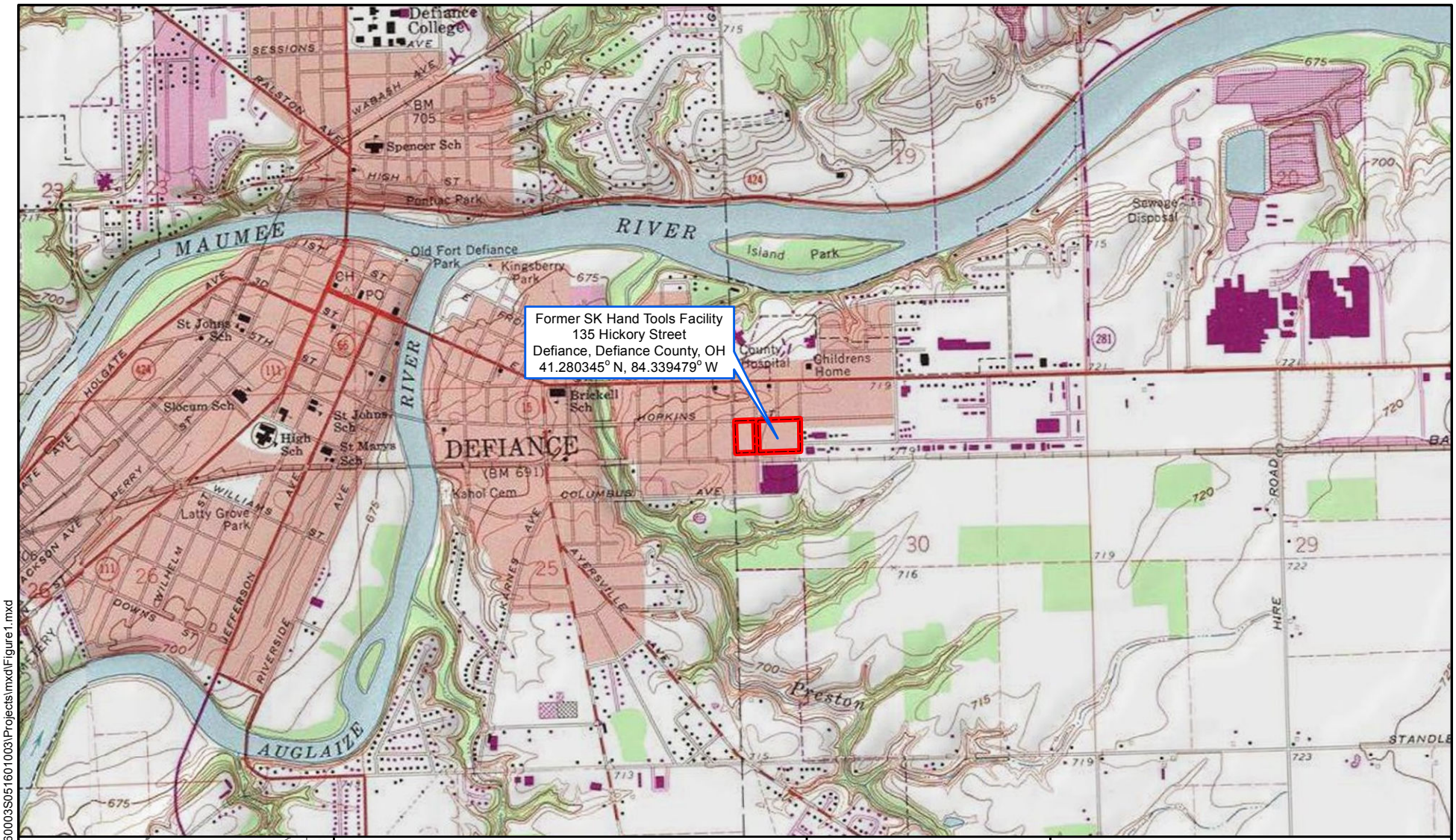
Ohio Environmental Protection Agency (Ohio EPA), 2009. Division of Drinking and Ground Water, Technical Guidance Manual for Groundwater Investigations. Chapter 8. Monitoring Well Development, Maintenance, and Redevelopment.

Tetra Tech, Inc. (Tetra Tech), 2014. Quality Assurance Project Plan (QAPP) For Region 5 Targeted Brownfields Assessment Projects in Indiana, Illinois, Michigan, Minnesota, Ohio and Wisconsin (For Hazardous Substances and Petroleum).

Tetra Tech, December 2015. Asbestos-Containing Materials Assessment, SK Hand Tool.

U.S. Geological Survey 7.5 Minute Topographic Quadrangle Maps: Defiance East, OH 1980 & Defiance West, OH 1972.

FIGURES



Legend

Approximate Property Boundary

Source:
USGS 7.5 Minute Topographic Quadrangle Maps:
Defiance East, OH 1980; Defiance West, OH 1972

EPA Contract No.: EP-S5-13-01
TDD No.: 0003/S05-0003-1601-003

N

1,000 0 1,000
Feet

Former SK Hand Tools
135 Hickory Street
Defiance, Defiance County, Ohio

Figure 1

Site Location Map

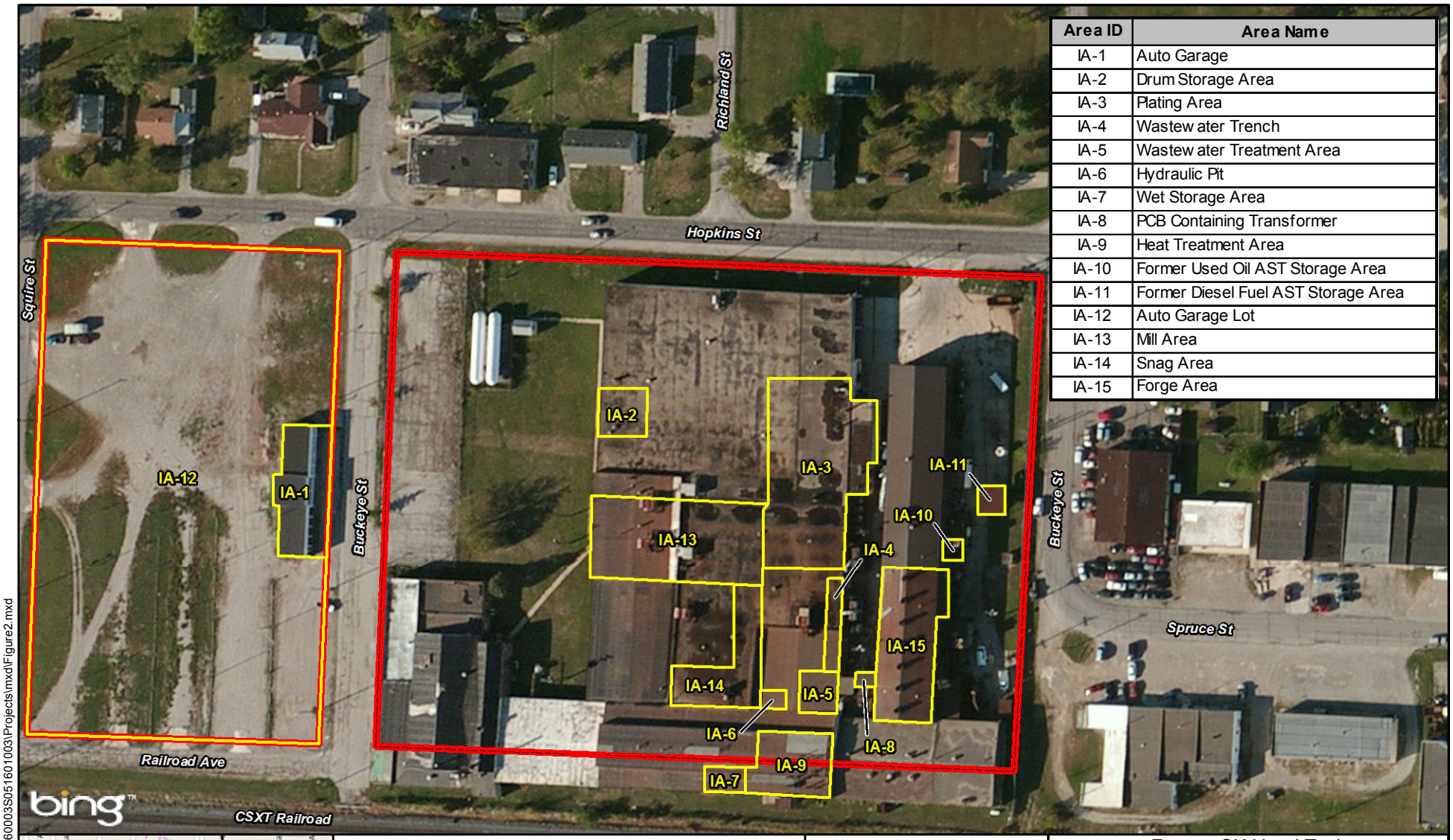
TETRA TECH

Prepared For: Kevin Losekamp | Prepared By: Nick Wiederholt

File Path: X:\R5_Projects\SK_Tool_103X\90260003\S05160100\3\Projects\mxd\Figure1.mxd

Date Saved: 2/23/2016

Coordinate System: NAD 1983 UTM Zone 17NTransverse Mercator



Area ID	Area Name
IA-1	Auto Garage
IA-2	Drum Storage Area
IA-3	Plating Area
IA-4	Wastew ater Trench
IA-5	Wastew ater Treatment Area
IA-6	Hydraulic Pit
IA-7	Wet Storage Area
IA-8	PCB Containing Transformer
IA-9	Heat Treatment Area
IA-10	Former Used Oil AST Storage Area
IA-11	Former Diesel Fuel AST Storage Area
IA-12	Auto Garage Lot
IA-13	Mill Area
IA-14	Snag Area
IA-15	Forge Area

Legend

- Approximate Property Boundary
- Identified Area (IA)
- AST Aboveground Storage Tank

Source: Bing Aerial Imagery, 2011;
Keramida, Former SK Hand Tools, Figure 4 - Identified Areas Map

EPA Contract No.: EP-S5-13-01
TDD No.: 0003/S05-0003-1601-003

N

65 0 65
Feet

Former SK Hand Tools
135 Hickory Street
Defiance, Defiance County, Ohio

Figure 2

Identified Areas Map

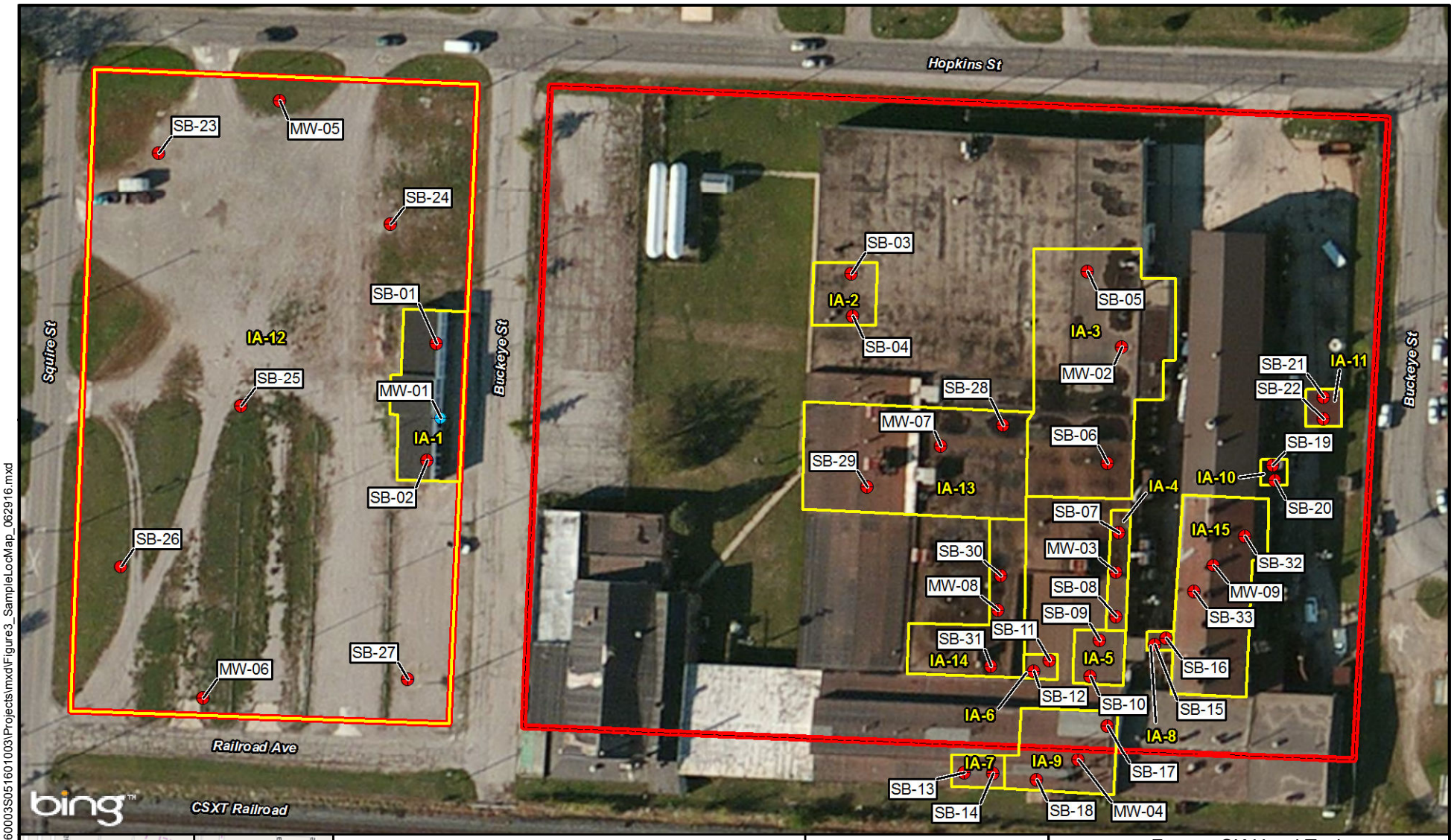
TETRA TECH

Prepared For: Kevin Losekamp | Prepared By: Nick Wiederholt

File Path: X:\R5_Projects\SK_Tool_103X\90260003\S05160100 3\Projects\mxd\Figure2.mxd

Date Saved: 2/26/2016

Coordinate System: NAD 1983 UTM Zone 17NTransverse Mercator



Legend

Sample Locations

Monitoring Well

Soil Boring

Approximate Property Boundary

Identified Area (IA)

Notes: Saturated soil conditions were not encountered at MW-02 through MW-09, therefore, monitoring wells were not installed at these locations.

Source: Bing Aerial Imagery, 2011;
Keramida, Former SK Hand Tools, Figure 4 - Identified Areas Map

EPA Contract No.: EP-S5-13-01
TDD No.: 0003/S05-0003-1601-003

N

50 0 50

Feet

Former SK Hand Tools
135 Hickory Street
Defiance, Defiance County, Ohio

Figure 3

Sample Location Map

TETRA TECH

Prepared For: Tim Schnieber

Prepared By: Nick Wiederholt

File Path: X:\R5_Projects\SK_Tool_103X90260003S05160100\3\Projects\mxd\Figure3_SampleLocMap_062916.mxd

Date Saved: 9/26/2016

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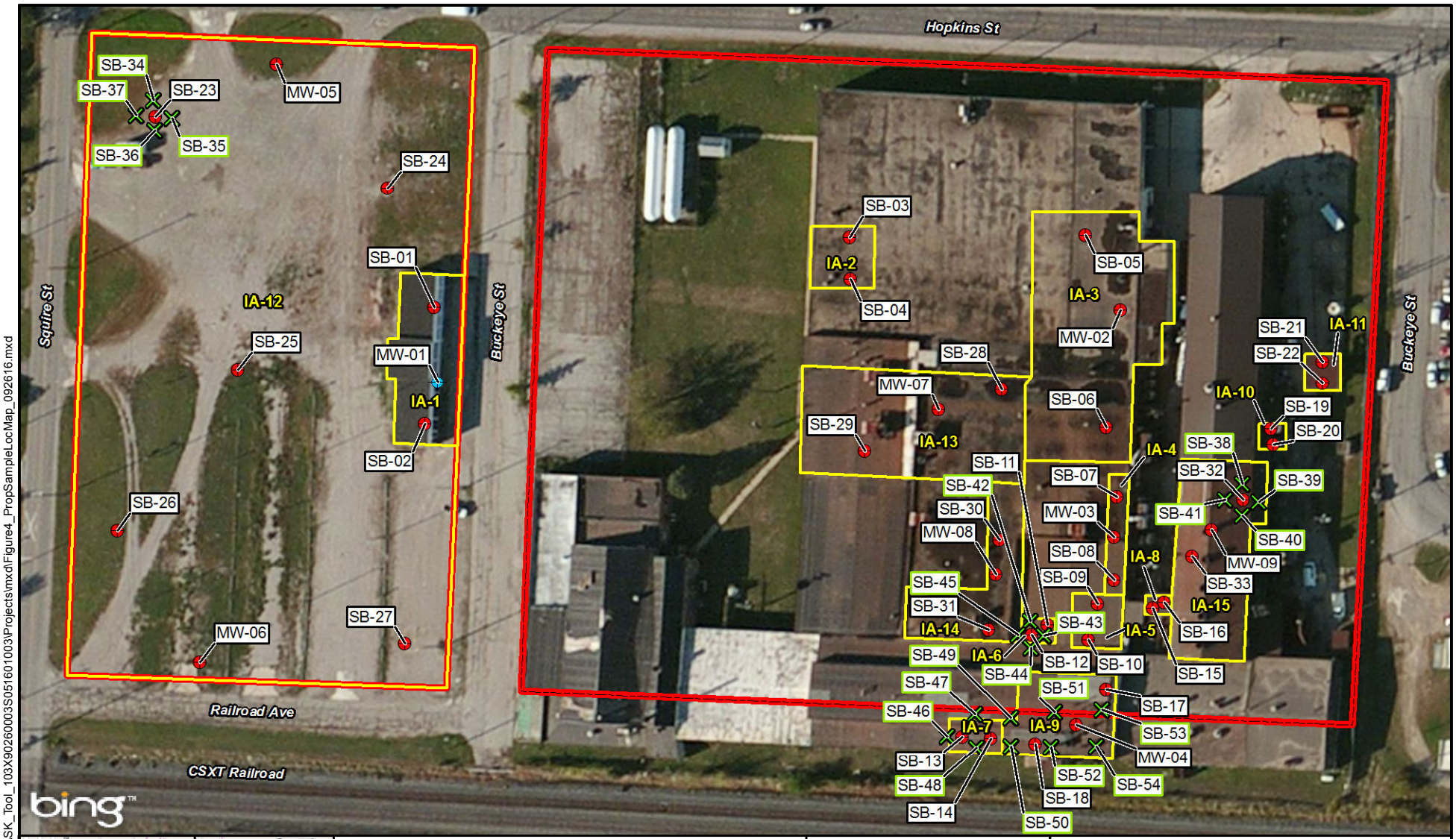

Legend

- Proposed Soil Boring Location
- Identified Area (IA)

Sample Locations

- Monitoring Well
- Soil Boring
- Approximate Property Boundary

Notes: Saturated soil conditions were not encountered at MW-02 through MW-09, therefore, monitoring wells were not installed at these locations.

Source: Bing Aerial Imagery, 2011;
Keramida, Former SK Hand Tools, Figure 4 - Identified Areas Map

EPA Contract No.: EP-S5-13-01
TDD No.: 0003/S05-0003-1601-003

N

50 0 50

Feet

Former SK Hand Tools
135 Hickory Street
Defiance, Defiance County, Ohio

Figure 4

Proposed Sample Location Map

TETRA TECH

Prepared For: Tim Schnieber | Prepared By: Nick Wiederholt

File Path: C:\GIS_Workspace\X\R5_Projects\SK_Tool_103X90260003S05160103\Projects\mxd\Figure4_PropSampleLocMap_092616.mxd

Date Saved: 9/27/2016

Coordinate System: NAD 1983 UTM Zone 17NTransverse Mercator

TABLES

Table 1
SAP Addendum Revision Form
Site: SK Hand Tools TBA
EPA PM: Brad Stimple
TDD: 0003/S05-0003-1601-003

Date	Rev. #	Proposed Change to SAP Addendum	Reason for Change of Scope/Procedures	SAP Addendum Section Superseded	Requested By	Approved By

Table 2
Summary of Sampling Program
Environmental Samples for Laboratory Analysis
SK Hand Tools TBA
Defiance, Defiance County, Ohio

Sampling Location ID	Total Depth	Proposed Sampling Horizon	Purpose	Analytical Parameters				
				TPH-GRO	TPH-DRO/ORO	Lead	Chromium (total)	Chromium (hexavalent)
SOIL SAMPLES								
SB-34	10 ft. bgs	Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)	Delineate SB-23 soil exceedances	-	-	2	2	2
SB-35		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		-	-	2	2	2
SB-36		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		-	-	2	2	2
SB-37		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		-	-	2	2	2
SB-38	10 ft. bgs	Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)	Delineate SB-32 soil exceedances	2	2	2	-	-
SB-39		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	2	-	-
SB-40		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	2	-	-
SB-41		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	2	-	-
SB-42	10 ft. bgs	Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)	Delineate SB-12 soil exceedances	2	2	-	-	-
SB-43		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-44		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-45		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-46	10 ft. bgs	Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)	Delineate SB-14 and MW-04 soil exceedances	2	2	-	-	-
SB-47		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-48		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-49		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-50		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-51		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-52		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-53		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
SB-54		Surface (0-2 feet bgs) & Subsurface* (2-10 feet bgs)		2	2	-	-	-
Duplicate	NA	NA	Quality Control	2	2	1	1	1
Total Number of Soil Samples Analyzed:				**36**	**36**	**17**	**9**	**9**

Notes:

* Sample interval from the subsurface soil will selected based field observations (PID, visual, and/or olfactory observations)
bgs – Below ground surface
DRO – Oil range organics
Ft – Foot or feet
GRO – Gasoline range organics
ID – Identification
MW – Monitoring well
ORO – Oil range organics
PID – Photoionization detector
SB – Soil boring
NA – Not applicable
TPH – Total petroleum hydrocarbons

Table 3
List of Anticipated Sample Quantities, Analytical Parameters, and
Sample Container, Volume, and Preservation Requirements
SK Hand Tools TBA
Defiance, Defiance County, Ohio

Laboratory Parameters	Laboratory Method	Sample Matrix	Number of Investigative Samples	QA/QC Samples			Sample Total[2]	Number of Containers[3]	Type of Container	Preservative	Technical Holding Time[4]
				No. Duplicate Samples	No. MS/MSD Samples[1]	No. Trip Blank Samples					
Lead & Total Chromium	SW-846 Method 6010B	Soil	16	1	1	0	17	1	4-ounce wide-mouth glass jar	Cool to 4 ˚C	6 months
Hexavalent Chromium	Method 3060A (Soil Prep) SW-846 Method 7196A	Soil	8	1	1	0	9	1	1-4 ounce glass jar	Cool to 4° C	30 days to digestion; 168 hours to analysis
TPH-DRO/ORO	SW-846 Method 8015B	Soil	34	2	2	0	36	1	1-4 ounce glass jar	Cool to 4˚C	14 days
TPH-GRO	SW-846 Method 8015A/OVAP	Soil	34	2	2	0	36	1	1-4-ounce wide mouth glass jar with no headspace	Cool to 4°C	14 days

Notes:
[1] MS/MSDs are not additional samples, but are instead investigative samples on which MS/MSD analyses are performed.
[2] Sample total does not include MS/MSD samples.
[3] The number of containers applies to each individual sample.
[4] All holding times are from the date of sample collection.

DRO – Diesel range organic
GRO – Gasoline range organic
MS/MSD – Matrix spike/matrix spike duplicate
No. – Number
ORO – Oil range organic
OVAP – Ohio Voluntary Action Program
SW – Solid Waste
TPH – Total petroleum hydrocarbon